The Cost of Perfection
A Design Professional's Perspective

The Risk of Trying To Attain Perfection

There is a downside to trying to attain a perfect project including increased costs and a fracturing of the project team among others; in the end this may even cost the success of the project. Owners that involve themselves in a collaborative and cooperative team approach with the design professional (and construction contractors when identified) are most likely to accomplish successful projects. This team approach involves the honest exchange of ideas, information and problem solving efforts that minimize costs and improve results. However, there is a trend with some owners to define a successful project as one without any risk to the owner. This "risk free" approach is anything but risk free; in fact it may be just the opposite. This document was written to explain some of the ramifications of this trend that involves risk shifting and cost recovery efforts by some owners in an attempt to attain perfect projects.

The Desire for Perfection

There is a natural inclination for owners to seek perfection in their projects. Construction industry surveys and studies indicate that between one-third and one-half of all projects are over budget or behind schedule and that more than one-third of owners of major new construction projects are involved in arbitration or litigation of construction contract claims.[1] Recent high profile megaproject cost "overruns" provide dramatic examples of this. As professionals and representatives for the public we naturally want to avoid being associated with projects that are not viewed as successes. In addition to a tightening of fiscal constraints and an elevated awareness of the need for better accountability the trend is for some owners to move closer and closer to wanting perfect or "risk free" projects. Of course, while this may be desirable for all parties involved, perfection is not reasonably achievable and the quest for perfection can be costly. Like any owner, these owners don't want any surprises, cost increases, delays or change orders. They would prefer to not have any of the risk associated with the project and they would prefer to not have to rely on the use of contingency funds. However, projects are not static; they are subject to changing conditions, requirements and constraints. While risk free perfection is desirable, it is not achievable for even the best-funded projects. The symptoms of this desire for perfection become evident in challenges the design professionals are finding themselves confronted with:

1. An owner thinking of the design professional consultant and its insurance policy as a potential source of money to cover contingencies.

2. A restructuring of risk so the design professional and the construction contractor are required to assume all risks, including extra costs or damages caused by the owner's own negligence through unfair contract clauses.

Why Not Seek Perfection?

While owners have every right to seek perfection in their projects, the downside is that it is not a realistic or practical approach to accomplishing "successful" projects. Owners need to understand the ramifications of their decisions when they do so. Professional engineering and design services are not commodities that can be bought off the shelf with a money-back-guarantee. The design and construction processes are inherently dynamic and fraught with decision points and inputs that are variable. Successful projects are attained through the collective working of a committed team with a vested interest in achieving the same outcome. The best "value" will be achieved through a process where the organizations best able to influence, manage and mitigate a risk are contractually responsible for them. When owners deviate from this they will not achieve the best value and will pay more, either in up front bids, through contingencies spending, through poor contractor performance or through claims.

To achieve the best value in the constructed project it is not in the best interests of the owner to try and produce the perfect set of plans. Instead, project refinements normally should be made during the construction phase through design improvements, explanations of design intent or change orders. This allows the construction contractor to use methods and details best matched to its experience, expertise and ideas. It does not mean that the design professional is not responsible to provide a design consistent with the project and contractual requirements. The important thing to consider is that one needs to keep the cost of quality versus the cost of trying to attain perfection in perspective when considering the role of the design professional and the value they bring to the project.

The Cost of Quality

In addition to the consideration of value in the constructed project, one also needs to understand that the "costs" associated with too high of an emphasis on quality to try to attain perfection comes at a price that is not linear with the resulting actual increase in quality. The graph depicts the relationship between quality, the costs of defects because of a lack of quality, and the associated cost relationship.[2] Optimally owners should strive to have the total costs of quality minimized, thereby minimizing overall project costs.

When owners or consultants begin demanding quality beyond this optimal point, it is not a linear increase in costs; rather they experience a steadily increasing cost of quality with minimal gain in benefit. With perfection never achievable, the costs of trying to achieve it become extremely high.

Some Common Misconceptions

The Unique Nature of Design and Construction - The nature of the design process is such that each project is unique – the first and only one exactly like it. This can be contrasted to a manufactured product that is perfected over time. Consumers buy products expecting perfection or make a trade-off to a lower priced option. Take, for example, a new car, which will be reproduced thousands of times. If you find a defect, you take it back to be corrected under warranty. This is because a manufactured product can be

"perfected" through product testing, design improvements and manufacturing process improvements during the life of the production line for that particular model and its predecessors. While the engineering, design and construction community continues to improve its methodologies and learn from the past each project is different with its own unique challenges. Thinking of the engineering and design process as a product has lead to some common misconceptions:

- Contract documents are 100% complete, free of any defects and contain everything needed for the construction contractor to do the job.
- No change orders are to be expected.
- No contingency budgets are necessary.
- Any construction change order probably stems from a design fault.
- Once there is a construction contract, the owner only has to pay for changes in the work that the owner initiates.
- All extra costs are damages regardless of their origin (e.g. *project improvements or changes at the request of the owner should be borne by the owner).*
- Design professionals are responsible to see that the construction contractor builds it right.
- Professional liability insurance is a no-fault policy.
- Design documents or construction contract documents are "guaranteed" or come with a "warranty" to be free from defects and fit for the intended use.
- More than a few "RFI's" on any project are clear evidence of defects in the design.

Professional Liability

In a typical public works construction project, the owner warrants the adequacy of the design to the construction contractor. This can result in a natural belief by many owners that the designer warrants the design to the owner. However, given the nature of the design process, this is not the case and a warranty is not made nor implied from the designer to the owner. The designer is a professional and held to a professional standard, not a standard of perfection. Because designers are not perfect, some level of design deficiencies exists on every set of plans and specifications. The courts have recognized this and the common law that applies to design professionals is that they must meet the professional standard of care in the performance of their professional services. In the event they do not meet the professional standard of care, they may be found to have acted in a negligent fashion. If a design professional's negligence causes an owner to suffer damages, the design professional should be held liable for these damages.

The rationale for this negligence-based liability is founded on the imprecise and judgmental nature of the design process and on how inaccuracies may creep into design documents without "negligence." Examples of some possible non-negligent errors or omissions might include:

- Using inaccurate or incomplete data provided by others that a design professional has a duty to use and a right to rely on.
- Scope of services specifically being reduced by the owner to save money in a situation where a more complete scope could have prevented or mitigated the loss or cost.
- Reliance on a vendor's data that is misleading or is not accurate.
- Unforeseen site conditions that were not detected through reasonable investigations.
- Changes in owners' personnel who have different understandings or expectations than the original personnel who championed the project and hired the design professional.

- Code and standard changes which become effective during the design process, resulting in design changes.
- Interpretations by building officials and inspectors, which may differ from the actual intent of the building ordinance or from previous interpretations.
- Contractors or owners misinterpreting design documents.

Professional Liability Insurance – Design professionals usually maintain professional liability insurance to cover the cost of the damages their negligence has caused. Professional liability insurance policies typically only provide coverage for professional negligence. All professional liability policies exclude coverage for liability the design profession assumes by contract except for liability that exists in the absence of such contract. That is, the policies exclude coverage for professional services that may meet the professional standard of care but do not meet the elevated standard of care agreed to in the contract. The policies also exclude any other losses the design professional may experience that are not caused by professional negligence; examples include liquidated damages, penalties and express warranties and punitive damages.

While professional liability insurance is sometimes incorrectly referred to as E&O (errors and omissions) which is a misleading characterization. It is frequently believed by owners and contractors that any deviation or item that caused a loss should be classified as an error or omission. However, as discussed above, minor errors and omissions are common and should be expected as part of the normal process. In fact, in most cases, it is only when designers' actions are negligent (i.e., fall below the professional standard of care) that professional liability insurance provides coverage.

Implications of Risk Transfer

The changing expectations and drive towards perfection normally lead to a reallocation of risks. The general principle in risk management is that the party with the most control and influence over a risk be responsible for that risk. When risks are improperly allocated, either programmatic or monetary contingencies are required. This only drives up costs and many times drives wedges between the project members.

Loss of Team Approach – An unfair allocation of risks is in many cases putting design professionals in a defensive position from the onset of the project. However, professional designers have always believed that their role should be one of a "trusted advisor" to the owner. The current shifts in risk allocation causes animosity between project team members and inhibits open communications. Without the opportunity to openly discuss options, risks and rewards and to provide creative solutions, the project will not benefit from the attributes of a trusted advisor.

Also, during construction, many owners frequently do not consider the design professional to be an important and valuable part of their team. This can be especially true when cost control issues arise during the construction phase. Design professionals frequently find themselves in situations where the owner has accepted construction contractor claims without involving the design professional in the evaluation process. Or worse yet, based on the theory there must have been an "error" or "omission", the owner demands that the design professional answer and defend all contractor claims. This forces the design professional to spend a significant amount of time in defending themselves and trying to get paid for their efforts on behalf of the owner. Sadly, these situations lead to strained and deteriorating relationships between design professionals and owners. The real loss in these situations is that the project

is then not benefiting from the knowledge of the design professional in what the original design intent was and why it was developed as such.

Cost To Owners – Hiring the most qualified design professional should result in the greatest value for the completed project through excellence in design and cost savings during construction by informed handling of emerging construction issues and support in addressing potential contractor claims. However, in light of these trends owners may be unable to attract and retain the most qualified design professionals to their projects if the owner knowingly, or unknowingly, unfairly allocates risks and demands perfection. The best and most qualified design professionals are more and more frequently shying away from these projects. Considering that the fees paid for design services are usually less than about 1% of the life cycle costs or 10% of the construction costs of a project, it only make sense to hire the most qualified design professional and for them to be an integral part of the project team.

Once hired under a project where risks have been unfairly allocated, risk avoidance by the design professional may also increase construction costs. In a lower risk environment, the owner may rely on the quality and creativity of the design to lower construction costs and life cycle costs. Conversely, on a high risk (for the design professional) project, to avoid the risk of claims, the design professional may over-design or keep the design overly simple. This approach can increase construction costs by requiring greater quantities of materials and possibly increase operating costs through lack of innovation or quality in design.

Owners are adamant that the design professional carry professional liability insurance. However, the unfair allocation of risk may interfere with the owner's access to insurance coverage. The claim may be viewed by the insurance company as an uncovered claim, since it may be based on contractual warranty or breach of contract.

If owners are to rely on professional liability insurance, they will have to base their claim on negligence. To do so, they will need to show that the design professional did not meet the professional standard of care. The owners will need to prove: 1) what the standard of care was (taking into consideration the complete contract/project situation including scope and responsibility issues), 2) that the design professional did not perform to this standard, 3) that the failure to do so was the cause of the damages, and 4) the specific amount of the damages. One of the risks is that the courts may find otherwise, leaving the owner without insurance company coverage and empty handed if the design professional can't directly cover the loss.

Implications of Underestimating Project Costs

A more serious situation can confront an owner when there has been deliberate underestimating of costs by the owner in order to obtain project approval. Recent studies of large public improvement projects indicate that public owners have not made improvements in cost estimating over the last few decades while all the tools and information sources to help make estimates have improved.[3] The speculation is that large projects have been intentionally under budgeted in order to obtain voter support for the financing approvals. Whatever the cause, almost all large public improvement projects contain initial cost estimating errors that result in the need for increased funding to complete the projects. This scenario creates a a strong incentive for the owner to look to design professionals for perfection and develop contracts that rely on design professionals and their insurers to help fund the projects.

As stated in a January 2004 article "… when cost overruns result (in whole or predominately) from deliberate and strategic Owner cost underestimation – as distinct from cost overrun attributable to the professional's failure to meet the professional standard of care – professional liability insurers will quite correctly and appropriately take the position that they have no responsibility since the causes of the cost overrun were outside the control or responsibility – not due to deficient performance – of their professional insureds."[4]

The article further concludes "At the end of the day the design and construction management professional will probably succeed in most situations in defending claims against it based on external risk factors which are outside the involvement, control or responsibility of the professional; however, what is equally clear is that exposure risk of the professional due to the potential or actual assertion of such claims arising out of external risk factors is substantial and an aggressive and successful defense may well irreparably damage relations with the Owner …"[5]

The external factors referred to in the above statement are those that the owner is responsible for and in control of. These include developing and approving a project budget, defining the project program, defining the scope and sequence of the project scope and cost estimating process, defining and implementing cost reporting procedures, decision-making regarding risk allocation, dispute resolution, delivery method, project management structure and amount of cost contingency.[6]

Role of the Design Professional

It should be clearly understood in these discussions of negligence and risk allocation that the authors in no way mean to suggest that design professionals be not accepting of their responsibilities as professionals and servants to the greater public good. Nor should it be construed that the standard of care be degraded. In contrast, it is widely recognized that the standard of care for professional engineering services has been and continues to be very high with ever increasing levels of productivity through training, education, experience, and the application of technology. Design professionals are typically contracted and compensated for a given risk sharing situation based on the ability to control those risks. When risks are allocated to those without the ability to effectively and efficiently control them, it will place a strain on the project and lead to a breakdown in the team.

Teamwork and Understanding

The best way for owners to establish a successful project program is to develop a collaborative relationship with its project team including the design professional acting in the capacity of a "trusted advisor." This should result in enhanced understanding between the owner and the design professional, both with their focus on a successful project. To accomplish this, owners may want to take the initiative in the following areas:

- Establish the design professional as a "trusted advisor" to the owner.
- Engage in meaningful contract negotiations, working toward contracts that provide the right elements to allow for project issues to be properly addressed and for risks to be fairly allocated.
- Candidly discuss with the design professional the owner's expectations of the design construction documents, realizing that they typically contain some errors and omissions – no set of documents is perfect – and the processes to identify and correct each problem as it arises, both during the design process and during construction.

- Make sure that owners' project representatives understand the following:
  - Imprecise and judgmental nature of the design business.
  - How inaccuracies can creep into design documents without negligence.
  - Standard of care/negligence issues.
  - Professional liability insurance issues.
  - Quality-price-schedule trade-offs.
  - Roles and responsibilities of the design professional.
- Plan for adequate contingency budgets, including those to pay for design enhancements or unexpected conditions.
- Foster a team approach among the construction contractor, the design professional and the owner.
- Have the design professional materially involved during the construction phase of the project, especially with respect to interpreting design intent and helping to resolve problems and conflicts.
- Insist on participating in all constructability reviews, whether or not the construction contractor has been identified.
- Include a design professional as an advisor to the owner when evaluating claims or disputes involving the design professional.
- Make sure the contract includes provisions for alternative dispute resolution short of arbitration or litigation. Probably the most effective and efficient dispute resolution techniques are "good faith" senior management discussions of disputed issues and mediation. Other recommended, but more cumbersome and expensive techniques are peer-review of design documents/project issues and "mini-trials".

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[1]Barry B. Bramble, Michael T. Callahan, Construction Delay Claims, (Third Edition, Construction Law Library, Aspen Publishers 2000).
[2]Cost of Quality Graph – based on Phillip B. Crosby, Quality is Free
[3]B. Flyvbjerg, N. Bruzelius, W. Rothengatter, Megaprojects and Risk: An Anatomy of Ambition (Cambridge University Press 2003).
[4]D. J. Hatem, Developing Risk Indicators for Evaluating Professional Liability Exposure on Major Public Projects: A Broader Dimensional Approach (Boston, Massachusetts, January 2004), p. 28.
[5]Ibid, p.37.
[6]Ibid, p. 25.

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